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ABSTRACT

This report compares two approaches to measuring task interdependence, a theoretically fruitful concept for analyzing an organization's technical system. Task interdependence exists among operating personnel in the degree that task performance of one operative constrains, augments, or otherwise poses contingencies for the performance of another. Of particular interest are contingencies that arise by virtue of workers' relative location in the workflow. The movement of pupils from one teacher to another for instruction, or "pupilflow," is the educational analogue of workflow. A self-report questionnaire developed in 1976 at Stanford University was compared with an objective approach developed at the University of Oregon, in which teachers were asked to record for 10 consecutive days the particular pupils whom they taught at any time during the day in each of five subject areas. After logs were obtained from the teachers, the data was assembled to reveal pupilflows and the teachers connected by them. Twenty-nine schools participated in the study; of these, approximately half had begun implementing Individually Guided Education Multiunit School programs two years earlier, while the other half served as controls. Results showed disappointingly low correspondence between the two measurement approaches. The paper offers a conceptualization of task interdependence for interpreting measures and for relating them to four common patterns of instructional organization--team teaching, cross-grouping, departmentalization, and the self-contained classroom. Tables of data appear throughout the report. (AA)

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TWO APPROACHES TO MEASURING TASK INTERDEPENDENCE IN ELEMENTARY SCHOOLS*

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Abstract

A questionnaire scale developed at the Stanford Center for Research and Development in Teaching for measuring task interdependence among classroom teachers was compared with an objective approach, based on teaching logs which teachers were asked to keep, designed to measure the same concept. Comparative data came from 29 elementary schools, approximately half of which were implementing an Individually Guided Education program. Results showed disappointingly low correspondence between the two measurement approaches. The author offers a conceptualization of task interdependence for interpreting the measures and the strengths of their association and for relating them to four common patterns of instructional organization--team teaching, cross-grouping, departmentalization, and the self-contained classroom.

Two Approaches to Measuring Task Interdependence

In Elementary Schools

Task interdependence has served as a theoretically fruitful concept for analyzing an organization's technical system (March & Simon, 1958; Thompson, 1967; Weick, 1965), and in recent years sociologists of education have adapted the concept to the study of elementary schools (Bredo, 1977; Charters, 1973; Cohen, 1976; Cohen & Bredo, 1975; Packard, Charters, & Duckworth, 1978; Pellegrin, 1970). Two main approaches have been used to operationalize the term, a questionnaire scale developed by Cohen and her colleagues at Stanford University and an objective technique based on teacher records of pupil instruction developed for the Management Implications of Team Teaching (MITT) Project at the University of Oregon. Both measures were included in one of the data-taking waves of the MITT Project, and this report examines their correspondence.

Conceptualization of Task Interdependence

The theoretical relevance of task interdependence lies in the assumption that its nature or intensity bears on the intricacies of the organizational and interpersonal processes required for the coordination of work. Task interdependence exists among operating personnel, following Weick's (1965) formulation, in the degree that the task performance of one operative constrains, augments, or otherwise poses contingencies for the performance of another. The interdependence may be reciprocal. The contingencies must somehow be managed so that the workers complement rather than conflict or interfere with each other. Of particular interest are contingencies that arise among workers by virtue of their location with respect to one another in the workflow.

As the workflow varies, different workers are brought into interdependent relations, the character and severity of the contingencies differ, and alternative organizational or interpersonal mechanisms are required for their resolution.

Common patterns of instructional organization found in elementary schools can be distinguished in terms of the task interdependencies and contingencies they imply among classroom teachers. Pupilflow, or the movement of pupils from one teacher to another for purposes of instruction, is the educational analogue of workflow.

The familiar pattern of the self-contained classroom entails no task interdependence. Each teacher instructs a single set of pupils in all subjects of the curriculum throughout the school term or year. Within this time frame there is no pupilflow. Team teaching, in its truly joint form, lies at the extreme of interdependence. In this pattern, two or more teachers assume responsibility for planning and conducting the instruction of the same group of students in most if not all subject areas (Shaplin, 1964). Interdependence is intense under this condition, the more so as the number of subject areas of collaboration and the frequency of joint teaching increases. Coordination is achieved by immediate, personal, and largely informal communication among the collaborators. The departmental plan entails interdependence by virtue of the fact that implicated teachers instruct common pupils and, thereby, are linked by a pupilflow, but it is a weak form of interdependence. Each teacher specializes in a subject area, according to this plan, and instructs pupils only in that subject. This is the conventional plan of secondary and higher education. Contingencies are few, centering mainly around simultaneous demands that may be made on the pupil's time, and can readily be

resolved by scheduling. Cross-grouping, a rather common pattern in elementary schools, holds greater potential for interdependence. Unlike departmentalization, teachers are not subject specialists. Here, each teacher assumes responsibility for instructing a subgroup of pupils in a given subject. For instance, pupils may be grouped to achieve homogenity in reading level and one teacher instructs the more advanced readers while the other teaches the less advanced group. This pattern would seem to pose no more contingencies that the departmental plan, except that in practice the cross-grouping may occur in several subject areas at once, each with a distinct principle for group formation, and, moreover, the pupils may be regrouped periodically. Problems of group management can mount rapidly as a complexity of the arrangement increases.

The Two Measures

The self-report measure developed by Cohen and colleagues at Stanford's Center for Research and Development in Teaching consists of the following questionnaire items (Cohen, 1976):

(1) How frequently do you jointly conduct instructional activities or lessons with at least one other classroom teacher for a common group of students?

To what extent do you have to take other classroom teachers into account in your teaching with respect to ....

(2) Your teaching approach?

(3) The content in the lessons you teach?

(4) The timing or scheduling of class periods?

Six response alternatives for the first item range from "never" and "less than once a month" to "at least once a day," while alternatives

for the other three items are "never," "a little," "a moderate extent," "a considerable extent," and "a great extent." Teachers are requested to answer the questions from the standpoint of their collaboration with regular grade-level teachers in the school, not aides, specialists, student teachers, or the like.

Cohen (1976) reported that the items formed a Guttman scale with reproducibility and scalability coefficients of .96 and .90, respectively, based on a sample of 422 California teachers. The scaling was done on a more restricted version of Item 1 than shown above (and than used in the present study). They had asked teachers to describe the frequency of their joint teaching separately for each of three subject areas (reading, science, and social studies) and used only responses concerning reading in the scaling. For present purposes we will examine the items as a summative scale, weighting response alternatives from 1 to 5 or 1 to 6 with the higher values representing greater task interdependence. It should be noted that the questionnaire approach generates scores for individual teachers, although task interdependence, in principle, is a relational concept.

The approach developed at Oregon was based on a data-taking procedure in which teachers were asked to record for ten consecutive days the particular pupils whom they taught at any time during a day in each of five subject areas--math, reading, language arts, science, and social studies (Packard, Carlson, Charters, Moser, and Schmuck, 1976). Special booklets were prepared to facilitate the logging of instructional contacts. The booklets listed the names of a 20 to 25 per cent sample of pupils enrolled in the schools. After logs were obtained from all classroom teachers in a school, the data were assembled in a pupil X teacher X subject X day matrix to reveal pupilflows and the

teachers connected by them. Only regular grade-level teachers were studied.

Codes were assigned to pairs of teachers, thereby reflecting the relational character of task interdependence. Two teachers were said to be in instructional interdependence if they taught at least some pupils in common in the same subject area during the two-week period; they were said to be in throughput interdependence if they taught common pupils but in different subjects. Occasionally a pair of teachers had both kinds of relationship, as for example when they shared the reading instruction of a group of pupils and when they traded pupils for instruction in science and social studies. Instructional interdependence was further scaled with regard to its intensity. A score of 1 indicated that a member of the pair taught the common pupils only on one day and in only one subject during the two-week period, while a score of 50 indicated that both members taught the common students in all five subjects every day. The higher scores approximate the condition of bona fide team teaching. If no instructional interdependence was observed, the pair was scored 0. Throughput interdependence represents the presumably less severe contingencies of cross-grouping or departmentalization. It was given a simple binary code for its presence or absence. In the analyses to follow we have distinguished the teacher-pairs who were caught up in departmentalized instructional arrangements from the remainder in throughput interdependence. The telling indication was that at least one of the members of the pair was a subject-matter specialist, limiting his or her instructional duties in the school to just one, or at the most two, of the five core subjects. We will call this weak form specialized interdependence.

The Stanford measure was included in one of the MITT Project questionnaires distributed to regular classroom teachers in 37 elementary schools across the country in the spring of 1976, while teaching logs were obtained and analyzed from teachers in 28 of the schools. Approximately half of the schools had begun implementing an Individually Guided Education/Multiunit School (IGE/MUS) program two years earlier and the other half served as controls in the longitudinal study (Packard, Charters, & Duckworth, 1978). Questionnaires with valid responses to all four items numbered 601 in the larger sample, or 94 per cent of the eligible staff members. Technical specialists, subject-matter teachers of art, music, and physical education, teaching aides, and the like were excluded. Valid responses to the questionnaire items and the teaching logs were obtained from 425 teachers in the subset of schools, or 93 per cent of the eligibles.

A problem arose in making comparisons of the two measures by virtue of the different units of measurement they employed. Where the Oregon approach assigned independence values to teacher pairs, the Stanford measure generated scores for individual teachers. To resolve the problem in the following analyses where comparisons are made at the individual level, we have disassembled the pairwise values so that they apply to the specific teacher. For instructional interdependence the teacher's score was the sum of the pair scores over all pairs in which he or she was implicated. On throughput interdependence the teacher was assigned a value of 1 if he or she were implicated in any such relationship or 0 otherwise. Similarly, teachers were coded 1 if they were subject specialists (i.e., in specialized interdependence relations) and 0 if not.

Table 1 gives the distribution of teachers over the several forms of task interdependence coded from the teaching logs. We show distributions separately for 15 IGE/MUS schools and the 13 controls for sake of interest. Teachers who were in instructional as well as throughput interdependence appear in the table according to their level of instructional interdependence. The distributions indicate that teachers without task interdependence, the self-contained classroom pattern, predominated in the conventional schools but not in the IGE/MUS schools. Task interdependence was more apt to take the form of instructional or throughput interdependence (of the cross-grouping variety) in the IGE/MUS schools and more likely to appear as specialized interdependence (departmentalization) in conventional schools. Relatively few teachers in either type of school were implicated in instructional interdependence relations at a level of intensity suggestive of bona fide team teaching (scores approaching 50).

Table 1

Table 1. Percentage Distribution of Teachers in Task Interdependence by the Objective Measure, Separately for IGE/MUS and Control Schools

Level	Form of Task Interdependence[a]	IGE/MUS Schools	Control Schools
	Instructional interdependence:		
6	Score 31 to 50	4%	1%
5	Score 11 to 30	14	3
4	Score 1 to 10	14	4
	Throughput interdependence:		
3	Not specialized	34	19
2	Specialized	9	19
1	No interdependence	25	54
		100%	100%
	Number of teachers	201	224

[a]Teachers classified as both instructional and throughput interdependence included in instructional interdependence.

Analysis of the Stanford scale. With respect to the Stanford questionnaire items, we first attempted to establish their performance as a Guttman scale in the sample of 601 teachers, but the scale analysis yielded unacceptably low reproducibility and scalability coefficients of .88 and .66, respectively. Item 1, which as noted above was not precisely the same as used originally by Cohen and colleagues, contributed the most scale errors and had the lowest inter-item correlations of the set.[1] When we treated the items as a summative scale and subjected them to a reliabilty analysis, the four-item scale had marginal reliability of .704 (Cronbach's Alpha) but with Item 1 removed it improved to .750.

The distinctiveness of Item 1, concerning the frequency of joint teaching, is understandable. It asks teachers about their teaching arrangements with colleagues, whereas the other three items seem to focus on the severity of the contingencies teachers pose for one another. Hereafter we will treat the three-item scale separately from Item 1.

Correspondence of measures. Table 2 gives the means of the three-item scale and the joint teaching item at the six levels of task interdependence as measure by the Oregon procedure. The general mean of 2.50 for the three-item questionnaire scale indicates that, overall, the 425 teachers said they took other teachers into account between "a little" and "a moderate extent" in their teaching. On the single item, the average teacher reported teaching jointly with others somewhat more often than once a week.

Table 2

Table 2. Mean Scores for the Three-Item Questionnaire Scale and the Joint Teaching Item for Six Levels of Task Interdependence

Level	Task Interdependence[a]	Three-item Scale		Joint Teaching Item		N of Cases[b]
		Mean	S.D.	Mean	S.D.	
6	InI 31-50	3.06	1.153	4.83	1.642	12
5	InI 11-30	2.75	.880	4.18	1.850	34
4	InI 1-10	2.89	.832	3.97	1.558	36
3	TpI	2.76	.897	3.57	1.663	109
2	Spz	2.58	.849	2.47	1.586	62
1	SC	1.90	.832	3.02	1.482	164
Overall		2.41	.959	3.32	1.678	417

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[a]Abbreviations: InI - Instructional interdependence score
TpI - Throughput interdependence
Spz - Specialized interdependence
SC - Self-contained (no interdependence)

[b]Three fewer cases for three-item scale, due to missing responses.

Means of the two questionnaire measures increase rather consistently with the objective level of task interdependence. The most notable departure from monotonic increase was the infrequency with which teachers working under a departmentalized arrangement (Spz) reported joint teaching. This could be expected. Subject specialization tends to preclude other forms of collaboration, at least in the elementary school. Teachers in specialized interdependence, nonetheless, said they took other teachers into account to a greater extent than those in self-contained classrooms and less than those involved in cross-grouping arrangements, according to the three-item scale. Although means of the three-item scale increased with task-interdependence level (except for 34 teachers with moderate instructional interdependence scores), the increases were not large and tended to taper off at the higher intensity levels. Thus, teachers in the most intense form of interdependence by the objective measure (InI scores above 30) still said they took colleagues into account in their teaching only to "a moderate extent" in their teaching. This coincides with other evidence from our study that the instructional interdependence relations in the schools tended to be casual and transitory, typically implicating just two teachers, and rarely entailed an intimately collaborative group effort (Charters & Packard, forthcoming).

The correlation ratios given at the bottom of the table estimate the overall correspondence of the measures. Although they differ significantly from zero, .3 values are hardly the reliabilty one would expect of measures purporting to index the same phenomenon.

We used another approach for examining correspondence. We regressed values of the three-item scale and the joint teaching item

on instructional interdependence scores, the dummy coded throughput and specialized interdependence indicators, and an interaction term formed as the product of the first two predictors. The interaction was entered to take account of 56 teachers who engaged in both team teaching and cross-grouping but who were subsumed under instructional interdependence in the preceding tabulations. A log transformation was applied to instructional interdependence scores to modify their extreme positive skew. Table 3 shows the intercorrelations and other details of the measures, while the results of the multiple regression are given in the lower part of the table.

Table 3

Table 3. Correlations and Regression Analyses for the Questionnaire and Objective Measures of Task Interdependence, Teacher Level (N = 349)

Intercorrelations

	TpI	Spz	3-Itm	Jnt	Mean	S.D.
InI[a]	.10	-.14	.21	.25	.23	.484
TpI[b]		.38	.36	.06	.55	.499
Spz[c]			.08	-.20	.16	.364
3-Itm[d]				.33	2.41	.959
Jnt[e]					3.31	1.674

Regressions

Independent Variable	Dependent Variable: Three-item Scale Beta	Dependent Variable: Joint Teaching Item Beta
InI[a]	.364*	.293*
TpI[b]	.445*	.158*
Spz[c]	-.066	-.233*
InI X TpI Interaction	-.271*	-.120
Multiple R	.44	.33

* Significant beyond .05 level.

[a]Instructional interdependence score, log transformation.

[b]Throughput interdependence, dummy coded.

[c]Specialized interdependence, dummy coded.

[d]Three-item scale.

[e]Joint teaching item.

The multiple correlations of .44 and .33 make it plain that, by this analysis too, the objective and subjective measures were not in substantial agreement. (Indeed, the two parts of the subjective measure were not in close agreement either, as indicated by the simple correlation of .33 between Jnt and 3-Itm.) The rather different ways in which the joint teaching item and the three-item scale were associated with InI, TpI, and Spz in the regressions fortifies our decision to analyze them separately.

The regression for the three-item scale yields some interesting observations if the measure is interpreted as reflecting the severity of contingencies in the several patterns of teacher collaboration. The departmentalized teaching pattern did not introduce contingencies beyond those experienced by the self-contained teacher, as indicated by the insignificant contribution of Spz. The significant interaction of InI and TpI implies that the relationship of InI scores and the contingency measure was of a different order in the presence of cross-grouping than in its absence. Our evaluation of the regression equation showed that in the absence of cross-grouping, contingencies increased regularly with the intensity of team teaching. In the presence of cross-grouping, though, the relationship was virtually nil. Cross-grouping itself profoundly increased the severity of contingencies and the addition of teaming had little further effect. In the end, only the most intensive teaming in its pure form (without cross-grouping) produced contingencies as severe as those associated with the cross-grouping pattern.

That the self-report of the frequency of joint teaching and the objective indicator of instructional interdependence should correspond so poorly is surprising. The beta for InI in the second regression

was only .29. It is also surprising that the presence or absence of the other two patterns of collaboration contribute to the prediction of joint teaching frequencies independently of InI. We were led to make a more detailed analysis of InI scores and the reported frequencies of joint teaching on the Stanford questionnaire. If the two measures corresponded exactly, teachers who said they jointly taught daily on the questionnaire item would have scores of at least 10 in instructional interdependence, those who said they taught jointly several times a week would display scores between 3 and 9, those who reported a frequency of once a week would have scores of 2, and the ones who reported a frequency of once or twice a month would, at best, have scores of 1. Teachers reporting a lesser frequency or who said they never jointly teach obviously should show instructional interdependence scores of 0. Some slippage can be anticipated in the correspondences, since the MITT scores of interdependence did not depend exclusively on frequency but took into account the number of subjects in which interdependence occurred, nor did they reflect the circumstance of joint teaching in the sense of simultaneous instruction in the same classroom. Nevertheless, the boxed cells in the cross-tabulation table specify the expectations.

Table 4

Table 4. Cross-tabulation of Responses to Joint Teaching Item and Instructional Interdependence Scores, Teacher Level

Frequency of Joint Teaching	Instructional Interdependence 0	1	2	3-9	10+	Total
At least once a day	31	0	1	5	[18]	55
Several times a week	46	0	1	[5]	14	66
About once a week	58	0	[1]	4	5	68
Once or twice a month	59	[0]	0	6	6	71
Less often or never	[142]	0	2	3	11	158
Total	336	0	5	23	54	418

	Per Cent
Agreement	39.7
Over-report	48.1
Under-report	12.2

The generally weak association of the two measures of joint teaching again is shown by the table. For instance, 31 of 336 teachers for whom no instructional interdependence was observed in the teaching logs nevertheless said they were involved in joint teaching with another grade-level teacher at least once a day. Only about two-fifths of the 418 cases showed the expected correspondence. The questionnaire item elicited a substantially higher incidence of joint teaching than the objective measure: nearly half of the teachers over-reported their joint teaching against the objective criterion, while 12 per cent under-reported it.

Correspondence of measures for faculty units. The existence of faculty units in that half of the schools of the study that were implementing the Multiunit model provided an opportunity to compare the measures using a unit of analysis better suited to the relational character of task interdependence than the individual teacher level of the preceding sections. By the spring of 1976 all but two of the 15 schools that had embarked on the innovative course retained the Multiunit structure. Teaching units typically consisted of three, four, or perhaps five teachers of the same or adjacent grade levels; anywhere from two to seven units were formed in a school, depending mainly on size of the school's staff. A second investigation, then, centered on the innovating schools.

To obtain values for faculty units, the questionnaire scores of individual teachers (the three-item scale and the joint teaching item) were simply aggregated for means. In the case of instructional interdependence, intensity scores of teacher-pairs were summed over pairs in the unit and divided by the total possible pairs, $\frac{1}{2}N(N - 1)$, where N is the number of teachers in the unit. These values ranged as high as

23.3 but the majority of units had intensity means of 0. A log transformation was applied to modify the skew. Throughput interdependence was expressed as the proportion of pairs in the unit (to total possible pairs) that were linked by such a relationship. These proportions were regularly distributed between 0 and 1.0. Three of the 52 units available for analysis had departmentalized teaching arrangements and were removed from the calculations.

Product-moment correlations among the objective and questionnaire measures are reported in the upper part of Table 5 and the regression analyses below. The levels of association tend to be higher when computed at the unit level than at the individual teacher level, as indicated by the multiple R's of .61 and .47, but these values are still low if considered as reliability coefficients.

Table 5

Table 5. Correlations and Regression Analyses for the Questionnaire and Objective Measures of Task Interdependence, Faculty Units (N = 49)

Intercorrelations

	TpI	3-Itm	Jnt	Mean	S.D.
InI[a]	-.13	.10	.48	.30	.393
TpI[b]		.48	.05	.52	.417
3-Itm[c]			.52	2.72	.702
Jnt[d]				3.86	1.157

Regressions

Independent Variable	Dependent Variable: Three-item Scale Beta	Dependent Variable: Joint Teaching Item Beta
InI[a]	.653*	.611*
TpI[b]	.741*	.184
InI X TpI Interaction	-.610*	-.189
Multiple R	.61	.47

* Significant beyond .05 level.

[a] Unit mean of instructional interdependence, log transformation.

[b] Proportion of teacher pairs in unit in throughout interdependence.

[c] Mean, three-item scale.

[d] Mean, joint teaching item.

Other details of the regressions generally parallel those of the teacher-level analyses. One can see again by the pattern of beta weights that the two questionnaire measures performed quite distinctively. Here, though, the self-report of joint teaching was associated only with the intensity of instructional interdependence, as could be expected. Again, the interaction term in the regression of the three-item scale made a significant contribution to the prediction. Evaluation of the raw score equation revealed a somewhat different response surface from that found for the teacher-level analysis: cross-grouping played a less important role in producing high scores on the three-item scale, and the intensity of teaming, particularly in the absence of cross-grouping, was strongly associated with them.[2]

Discussion

It is apparent that the two approaches for measuring task interdependence did not provide equivalent information. This is disappointing, since the objective measure is comparatively costly for large-scale research, entailing the preparation of teaching logs for each school, their administration and retrieval at different times, the use of nonstandard data-handling and scoring procedures, and so on. We had hoped to find that the less expensive questionnaire approach would prove an acceptable substitute.

Especially puzzling was the nonequivalence of the objective measure of instructional interdependence and the teacher's direct report of the frequency of joint teaching, most clearly revealed in the cross-tabulations of Table 4. The phenomenological reports could have been biased toward behavior teachers felt they should be displaying, particularly in light of the fact that half of them were

in schools where they had committed themselves to an effort to implement a team teaching plan. Another analysis we made, however, discounted this explanation. Over-reporting of joint teaching was no greater in the innovating schools than in the control schools. Alternatively, the over-reports could have been due to a broad interpretation of the term joint teaching on the part of respondents. To many teachers it carries the connotation of collaborative planning--the notion of sharing ideas about curriculum materials and teaching strategies and helping one another with lesson planning, without literally instructing pupils together. The fact that TpI contributed positively and Spz contributed negatively to the prediction of joint frequency scores in Table 3 gives substance to this explanation. One would expect collective planning of this variety to be important under cross-grouping and to be inimical to the departmentalized teaching arrangement.

It has become clear on the basis of the item analysis and their differential relationships with the objective measures that the four questionnaire items devised by the Stanford researchers were not "all of a piece." The three items asking teachers about the extent to which they "take other teachers into account" in their teaching, which formed a reasonably consistent scale, reference contingencies, or at least three representative ones, that might be expected to ensue from particular work arrangements. The joint teaching item, like the objective measures, describe those arrangements. In this sense, then, relationships of the three-item scale and the others can better be conceived as indications of construct validity than as reliability estimates. The scale's multiple correlation with the objective

indicators of .44 at the teacher level and .61 at the unit level represents respectably strong evidence of such validity.

When the three-item scale is viewed as indexing the severity of contingencies associated with different types of task interdependence, the data point of some substantive conclusions about teaching arrangements in our sample of schools. The departmentalized arrangement, with teacher specialization by subject matter, introduced few contingencies beyond those experienced by teachers in self-contained classrooms. Inspection showed that the contingencies centered almost exclusively on scheduling matters. One can imagine that the adoption of a departmentalized plan secured for teachers the same autonomy in teaching ordinarily enjoyed under the self-contained pattern. The cross-grouping pattern, on the other hand, was accompanied by severe contingencies--nearly as severe as those under the most intensive form of team teaching. Other observations from the study revealed that throughput interdependence in the sample schools often indexed highly intricate systems of pupil subgrouping and teaching assignments, implicating four or five teachers and perhaps 75 to 100 pupils. In retrospect, we wish we had been abled to devise a measure of the complexity of cross-grouping patterns rather than merely to code their presence or absence; relationships with the contingency scale might have been even clearer. As we have mentioned, the team teaching arrangements observed in the schools were comparatively simple systems usually consisting of no more than two teachers and their respective pupils that frequently did not endure for more than a single school term. Schools with more "mature" teaching teams might have given stronger results.

[1]With Item 1 removed the three-item scale had a reasonably high scalability coefficient of .875, suggesting unidimensionality. For scaling purposes the first three response alternatives were taken as positive responses and the remainder as negative ones. The order of items from "hardest" to "easiest" was teaching approach, lesson content, and scheduling.

[2]The raw score equation was,

$$\hat{Y} = 1.67(X_1) + 1.25(X_2) - 1.64(X_1X_2) + 1.94,$$

where $\hat{Y}$ is the unit's predicted mean on the three-item scale, X_1 is the log of the mean instructional interdependence score, and X_2 is the proportion of teacher pairs in throughput interdependence.

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